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DSSD CENSUS 2000 PROCEDURES AND OPERATIONS MEMORANDUM SERIES B-3*

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Subject: Quality of Census 2000 Processes

The attached document was prepared, per your request, to assist the Executive Steering Committee on A.C.E. Policy in assessing the data with and without statistical correction.

This report focuses on the quality of selected Census 2000 processes. This document contains a description of the Operations and Quality Assurance (QA) programs for these Census 2000 operations. Not all of the operations and procedures conducted in Census 2000 will be discussed in this document. The procedures discussed were chosen for inclusion in this document because they are the basic stages of the census operation and most relevant to overall census quality and coverage. All results and findings presented in this document are preliminary and subject to verification upon receipt of final data files.

Quality of Census 2000 Processes

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U.S. Census Bureau

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Executive Summary

This report focuses on the quality of selected Census 2000 processes. This document contains a description of the Operations and Quality Assurance (QA) programs for these Census 2000 operations. Not all of the operations and procedures conducted in Census 2000 will be discussed in this document. The procedures discussed were chosen for inclusion in this document because they are the basic stages of the census operation and most relevant to overall census quality and coverage. All results and findings presented in this document are preliminary and subject to verification upon receipt of final data files.

Address List Development

We give data on housing unit (HU) records that have been delivered to the Decennial Master Address File (DMAF), the address list for Census 2000 operations. The HU records are classified according to when they were added to the DMAF: Pre-Questionnaire Delivery, at the time of Questionnaire Delivery, or Post-Questionnaire Delivery. There is an additional tally of the HU records by Type of Enumeration Area (TEA), a possible explanatory variable for variation in rates of Pre-Questionnaire Delivery or Questionnaire Delivery records. Because HU records were acted on during the census process, the DMAF is not the same as the final list of census addresses.

What is the profile of addresses, by time of delivery to the DMAF?

The national percent of addresses in Pre-Questionnaire Delivery is 96.7 percent. Regional values vary little from the national average, ranging from 96.3 to 97.6 percent. The state values range from 80.8 to 98.7 percent. The national level of addresses added during Questionnaire Delivery is 1.8 percent. Regional values range from 1.0 to 2.1 percent, while state values of Questionnaire Delivery range from 0.1 to 17.8 percent. The national rate of addresses added in Post-Questionnaire Delivery operations is 1.3 percent, with regional values ranging from 1.2 to 1.4 percent. State values range from 0.7 to 2.7 percent.

What is the profile of addresses, by enumeration methodology?

Mailout/Mailback areas comprised 80.0 percent of the total HU records. Regional rates of Mailout/Mailback ranged from 72.5 to 85.8 percent, and state rates ranged from 26.6 to 99.9 percent. Update/Leave areas contained 18.8 percent of the total HU records, with regional values ranging from 11.9 to 26.9 percent. State values ranged from 0.1 to 72.4

percent. The Update/Enumerate operation accounted for 0.8 percent of the HU records nationally, but state values ranged from 0.0 to 8.4 percent. The List/Enumerate areas have 0.3 percent of the HU records nationally, with state values ranging from 0.0 to 15.8 percent.

Which areas of the country have rates of particular interest?

There is a regional disparity in percent of HU records added during Questionnaire Delivery. It was 1.0 percent for the Midwest, which is significantly lower than the national average of 1.8 percent, and 2.1 percent in the South, which is significantly higher. The likely reason is that population and housing are growing quickly in southern states but less quickly than the national average in the Midwest.

The percent of addresses in Update/Leave areas varies widely by region. The national average is 18.8 percent, but the West region has 11.9 percent of its HU records in Update/Leave areas, while the South has 26.9 percent of its HU records in these areas. This disparity is reflected mostly in a corresponding change in the rates of Mailout/Mailback.

Respondent Cooperation

The mail return rates for Census 2000 were calculated at the national and state levels in order to measure the level of respondent cooperation in the census.

How did the mail return rates in 2000 compare to the rates in the 1990 Census?

Between 1990 and 2000, mail return rates nationwide declined by two percentage points, from 74 percent to 72 percent. At the state level, the change in mail return rates from 1990 to 2000 ranged from an increase of about one percentage point in Massachusetts and California to a decline of about nine percentage points in Kentucky.

Nonresponse Followup

The Nonresponse Followup (NRFU) is the operation that enumerated housing units in the mailback areas for which no questionnaire had been returned before the field followup operations began. The NRFU workload includes addresses for which no questionnaire had been received as of April 18, 2000. The NRFU field operations began for most LCOs on April 27, 2000 and was completed by most LCOs by June 26, 2000.

What was the size of the Nonresponse Followup (NRFU)?

The NRFU field workload included 41,728,393 addresses. These addresses represent 35.4 percent of the addresses eligible for the NRFU if no questionnaire was returned before the NRFU field operations began. States in the Midwest region of the country

generally had the lowest proportion of addresses in the NRFU field workload. Within the 50 states and the District of Columbia, the proportion of NRFU eligible addresses included in the NRFU workload ranged from 26.9 to 47.1 percent.

Coverage Improvement Followup

The NRFU was followed by the Coverage Improvement Followup (CIFU). The CIFU served as a check on addresses found to be vacant or deleted (nonexistent) in the NRFU. Some of the NRFU identified vacant and deleted housing units were excluded from CIFU: housing units identified as vacant or delete in another previous census operation or housing units identified as seasonal vacant during NRFU. It also included addresses requiring followup but identified too late to include in the NRFU. These later addresses included ones added in update/leave operations that were not in NRFU, addresses added from the post office updates that were not in NRFU, addresses added from the Local Update of Census Addresses (LUCA) appeals process that were not in NRFU, addresses with a blank or lost questionnaire, addresses added in an update for new construction, and addresses in the experimental programs.

What was the size and outcome of the Coverage Improvement Followup (CIFU)?

A total of 8,664,519 addresses were in the CIFU. Over 74 percent of them were included in the CIFU because the NRFU had found them to be vacant or deleted. Of the vacant or deleted addresses in the NRFU, the CIFU operation found more than 23 percent were occupied.

Preliminary Results of the Census 2000 Housing Unit ID Inventory Processing

Housing units were removed from the census by one of three processes:

- Two independent census operations determined the housing unit not to exist and there was no data capture or two addresses were determined (matched) to be the same housing unit. It was removed from the address file.

- There was conflicting information about the existence of the housing unit. Either Nonresponse Followup or Coverage Improvement Followup determined the housing unit did not exist, but a data capture existed for the housing unit. In these cases, we established rules to determine the final status of the housing unit.

- Expanded address and person matching rules identified housing unit duplication. Duplicates were removed from the census.

What is the profile of the housing units IDs removed from the Census 2000 Address List because they were determined not to exist?

Nationally 8.2 percent of the housing units in the Decennial Master Address File (DMAF) were determined not to exist and thus removed.

Primary Selection Algorithm

More than one census response may have been received for a given address. The purpose of the Primary Selection Algorithm (PSA) was to select the responses for each address that should have been included on census files representing the final census enumerations.

Multiple responses to the census can occur because there are various ways to respond. A person may mail back the census form delivered to his home; he may be interviewed by a census enumerator; he may fill in a Be Counted Form and mail it in; he may fill out a form online and return it via the Internet; he may be enumerated at a group quarters (e.g., a military base) and elect to provide a different address, that is a Usual Home Elsewhere (UHE), at which he thinks he should be counted. The objective of the PSA is to select records that best describe the household that lived at the address on Census Day, i.e, the "census household." When selecting from multiple returns for a census address, the PSA sought to minimize the chance of erroneous inclusions or omission to the census.

Census operations generated few enumerations of conflicting households at a single census address. PSA found that the multiple returns for a single address seldom appeared to represent different households. When the multiple returns represented the same household, most often one of the returns for the address contained all of the persons listed on the other returns at that address.

How often did the Census Bureau enumerate different households at the same address?

The Census Bureau received multiple returns for about 9 percent of the census addresses. The PSA operation determined that the multiple returns for a single address represented the same census household about 78 percent of the time. Many addresses with multiple returns had only vacant returns.

The PSA also found that there were conflicting enumerations at about 2 percent of the addresses. These conflicting enumerations included cases where there were two occupied housing units at the same address about 38 percent of the time. About 45 percent of the time there was an occupied household and as well as a vacant household. These latter cases were likely the result of the Coverage Improvement Followup enumeration of occupied addresses found to be vacant by the Nonresponse Followup operation.

How often did the census receive duplicate enumerations for the same household?

When the PSA determined that multiple returns belonged to the same household, it applied criteria for designating one return as the 'basic' return to which all 'other' returns could be compared. The PSA found that when it determined multiple returns belonged to the same household, the 'other' returns duplicated the 'basic' return about 94 percent of the time. These duplications include 'other' returns that contained only persons already listed on the 'basic' return and 'other' returns that showed the address was vacant.

Item Imputation - Completeness of the Data for Housing Units Only

We produced preliminary item imputation rates for five characteristics: age, sex, race, Hispanic origin, and tenure. Each characteristic is considered to have an imputation after an edit, an allocation, or a substitution occurs on the response for that item. The universe for this analysis is restricted to housing units included in the census and persons associated with these housing units. Note that the imputation rates reported in other memoranda in this series may not be calculated in the same manner.

What is the profile of the overall item imputation rates for Census 2000?

The overall item imputation rates for the five characteristics range between 3.0 and 7.2 percent at a national level:

- The age item has the highest total imputation rate of these characteristics, 7.2 percent. We believe that the high imputation rate for age is due to including the age and date of birth items in the same question on the enumerator questionnaire. The enumerator may have asked for only the date of birth information to speed up an interview, figuring that the age could be computed from a person's date of birth. In a case where the enumerator received the date of birth information and then forgot or incorrectly filled the age portion of the question, imputation filled the age field correctly.

- The sex item has the lowest total imputation rate of the five characteristics at 3.0 percent.

- The total imputation rate for the race item is 5.0 percent.

- The total imputation rate for Hispanic origin is 5.4 percent.

- The total imputation rate for tenure is 5.3 percent.

Quality Assurance

What were the overall objectives and results of the Census 2000 Quality Assurance programs?

The Quality Assurance (QA) programs had the following objectives: prevent errors due to lack of knowledge or understanding on the part of the lister/enumerator, control coverage and content errors, and promote continuous improvement of performance.

In general, the preliminary QA results are within the expected range for each of the programs.

Address List Development

Introduction

For the address list-building operations, the country was divided into TEAs, depending on address types and the need for special enumeration or questionnaire delivery procedures. Not every address list-building operation occurred in every TEA. However, within some TEAs there was overlap in the timing of the address list-building operations.

The classification of HU records by relationship to Questionnaire Delivery operations was based on which address list-building operation was initially responsible for adding the address to the list, known as the Original Source of an address (Rothhaas, 2001). When an address was independently added by two or more overlapping operations, the Original Source is a combination of those address list-building operations.

Methodology

Determining time of delivery

Each HU record on the Master Address File (MAF) was coded for Original Source when a complete extract to update the DMAF was created. The Original Source reflects the address-list building operation(s) that added the address to the MAF. In some cases the Original Source was Undetermined because data was conflicting. The relationship of the HU record to questionnaire delivery was determined by the timing of the Original Source operation(s). Some address list-building operations, such as Block Canvassing, were intended to build the address list before the census. Records with these Original Sources are Pre-Questionnaire Delivery records in the tables. In Update/Leave and Update/Enumerate areas, HU records could be added during hand delivery of questionnaires, while in List/Enumerate areas, the address list was created at the time of questionnaire delivery. Such addresses are Questionnaire Delivery HU records. It was also possible to add addresses in operations such as Nonresponse Followup and Coverage Improvement Followup, which followed up on units in mailback areas that did not return delivered questionnaires. These HU records are classified as Post-Questionnaire Delivery.

The timing of a few operations overlapped with questionnaire delivery. When the Original Source showed that both questionnaire delivery and one of these operations independently added a HU record, the HU record was designated as having been added at the time of Questionnaire Delivery. However when one of these overlapping operations added a HU record that was not added during questionnaire delivery, the timing of that operation was used to determine whether the HU record was added Pre-Questionnaire Delivery or Post-Questionnaire Delivery.

Files

Numbers for this document were created from the November 2000 MAF extract used for tabulation geography. The MAF is a file of all address records that the Census Bureau has

information about. Those records that were considered to be valid housing units for the census were delivered to the DMAF, which was used as a control file for the census. Records on the DMAF were updated from census operations and from new information on the MAF. When MAF extracts for updating the DMAF were complete update files, the Original Source was coded from the MAF for evaluations files.

Limitations

The most significant limitations on the counts of HU records given in this document are:

- Some of the HU records on this file were deleted by census processes, thus the DMAF-deliverable Census 2000 HU count is larger than the final Census 2000 HU count and is not directly comparable to the final HU count from the 1990 Census.

- Certain HU records on the MAF were found to be duplicates of each other, although originally they were not identified as such. These records were merged in such a way that the records still exist on the MAF, but an ID field flag on the record indicates that it is a duplicate of the other identified record. On the November 2000 MAF extracts, the flag identifying if the record had ever been delivered from the MAF to the DMAF was set back to "N" for the merged records to indicate that the record was no longer deliverable to the DMAF. The count of records ever delivered from the MAF to the DMAF contains some of these merged records. The counts for this document should include all HU records that were ever delivered to the DMAF. To count the merged records, it is necessary to include the records with valid duplicate IDs along with the records with the DMAF-deliverability flag set to "Y," even though not all of the merged records were delivered to the DMAF. Thus the number of housing units in this section is larger than the number of housing units on the DMAF. The reason the MAF extracts were used to categorize these HU records is that the Original Source variable is only on these files. The Original Source variable was used to classify the records as Pre-Questionnaire Delivery, Questionnaire Delivery or Post-Questionnaire Delivery.

- On some HU records the state code changes from one delivery to another, due to updating operations. The numbers for this document were calculated from the state-level files that were created using the original state code, but the current state code could be different because of these changes. We are doing research to count and classify these records.

Quality Assurance

The QA program for Address List Development had the following three objectives:

- Prevent errors due to lack of knowledge or understanding on the part of the lister/enumerator.
- Control coverage and content errors.
- Promote continuous improvement of performance.

These objectives were applied to address listing operations using a combination of the following four tools. Not every tool was used to meet each objective.

- Initial Observation.

    A crew leader (CL) or crew leader assistant (CLA) conducted an initial observation to ensure the listers/enumerators produced work according to the established procedures. The crew leader or assistant observed the listers/enumerators working in the field for a total of ten cases for each lister/enumerator. If they found any errors, the crew leader or assistant informed the lister/enumerator of the errors and retrained the lister/enumerator. This method of feedback helped to improve the lister's/enumerator's performance.

    We developed this review of each enumerator's work at the beginning of their first assignment to prevent unintentional errors. For QA purposes, we assumed the crew leader or assistants did not make any errors during the assessment since they received more training than the enumerators. One limitation of this QA check is that it was not a representative sample of the lister's/enumerator's work, so no inferences can be made regarding the quality of the lister's/enumerator's work – only the lister's/enumerator's ability.

- Dependent Review.

    Following the completion of (or throughout) an Assignment Area (AA), a CL or CLA checked a random QA sample of the completed work. The CL recorded each housing unit (HU) sampled and the type of error(s) identified, if any, to determine whether it was acceptable. If the number of errors in the sample was above the tolerance level, the AA was rejected and recanvassed. If the number of errors in the sample was below the tolerance level, the AA was accepted. Accepted AAs continued to the field office.

    For QA purposes, we assumed the CLs and CLAs did not make any errors since they received more training than the listers/enumerators. The CL or CLA also informed the lister/enumerator of errors made and retrained the lister/enumerator as necessary. This method of feedback helped to improve the lister's/enumerator's performance. We developed this review of each work assignment completed by a lister/enumerator to minimize coverage and content errors.

- Reinterview (List/Enumerate (L/E) and Update/Enumerate (U/E) operations only).

    A separate office staff conducted a review of each enumerator's work to ensure accuracy of data collection. Throughout the operation, the OCS2000 selected cases administratively based upon a statistical comparison of the characteristics of each enumerator's work to that of the other enumerators in their crew leader district (CLD).

    If the characteristics of an enumerator's work were out of tolerance for the CLD, the supervisor entered the enumerator's name into the OCS2000 and the system began selecting cases for reinterview. Clerks transcribed original information onto a reinterview

form for selected reinterview cases. Reinterview staff contacted households by telephone or personal visit to conduct the reinterview. A supervisor reviewed the reinterview results, decided if errors existed, and took the appropriate action. A Field Operations Supervisor (FOS) notified enumerators of performance errors or discrepant results. This method of feedback helped to improve the enumerator's performance.

- Office Review. An office clerk performed the office review by reviewing 100 percent of housing units listed in the address binders. When an address binder did not meet the acceptable quality level, the office clerk returned it to the enumerator for corrections. This review also helped to minimize coverage and content errors.

Some limitations of this QA approach are:

- The CLs and CLAs conducted some Dependent Reviews prior to the completion of all work in an AA. This was due to time limitations in the process. Any remaining work in the AAs was not subject to review or rework.

- The QA activities conducted in very sparsely populated areas were limited in the kinds of QA that could be implemented.

- The reinterview program was designed to only detect instances of significant fabrication. If an enumerator did not consistently fabricate, the reinterview program was not likely to identify the discrepant results.

Results

Address List Compilation

In Table 1 below we give preliminary numbers for the classification of HU records on the DMAF by time of delivery to the DMAF, nationally and by region. This is a classification of all HU records that were ever delivered to the DMAF, or that have been merged, as represented on the November 2000 MAF extracts used to determine Tabulation Geography.

Pre-questionnaire delivery accounts for 96.7 percent of all addresses delivered to the DMAF. The vast majority of HU records in the census were on the census address list in advance of the census and resulted in preprinted questionnaires.

Questionnaire delivery is responsible for adding 1.8 percent of the addresses delivered to the DMAF. This reflects areas of List/Enumerate operations, as well as the operations in which HU records were added at the time of questionnaire delivery, which were Update/Leave and Update/Enumerate. Regional values vary from the national average.

The Post-Questionnaire Delivery operations account for 1.3 percent of the addresses delivered to the DMAF. The regional values are similar to the national average.

Undetermined Original Source HU records account for a negligible 0.3 percent of the records delivered to the DMAF. This figure is consistent through the regions.

See Table A-1 for these tallies at the state level. Table A-2 gives the tallies by TEA at national, regional and state levels. The TEA distribution offers a possible explanation for some of the variation in the state values of HU records delivered at the time of Questionnaire Delivery and Pre-Questionnaire Delivery.

Table 1: Census 2000 address list housing unit records, by time of delivery to DMAF
Preliminary Data

		Total	Pre-Questionnaire Delivery Operations	Questionnaire Delivery	Post-Questionnaire Delivery Operations	Operation Undetermined
Nation		128,691,771	96.7	1.8	1.3	0.3
Region	Northeast	24,545,009	96.7	1.7	1.4	0.3
	South	47,344,579	96.3	2.1	1.4	0.3
	Midwest	29,750,345	97.6	1.0	1.2	0.3
	West	27,051,838	96.4	1.9	1.3	0.4

Quality Assurance

The following preliminary QA results are available from the Address List Development program:

- The expected QA coverage range was between 75 percent and 100 percent since the design allowed for partial checks of some work assignments. The QA coverage actually ranged from 56.8 percent to 80.5 percent. Based on our observations, we think the coverage shortfall was largely due to insufficient staff and unrealistic deadlines implemented at the local and regional levels.

- We expected no more than five percent of the work assignments to fail. Less than four percent of the assignments actually failed the QA checks.

- We expected approximately one percent of the cases completed by the operation would be selected for reinterview. The actual reinterview workload was one percent for the U/E operation and two percent for the L/E operation.

- Discrepant results were found in approximately eleven percent of the U/E reinterview cases and approximately six percent of the L/E reinterview cases.[1]

Some limitations of the QA data are:

- Some Local Census Offices (LCOs) experienced delays starting up their reinterview programs. These delays may have hindered the reinterviewers ability to accurately verify census data.

- A significant number of QA forms were lost and/or completed incorrectly. These lost/incorrect forms obstructed our data capture/analysis activities.

Respondent Cooperation

Introduction

Mail return rate refers to the number of occupied housing units with corresponding non-blank questionnaires checked in by the late cut for Nonresponse Followup (NRFU) over the number of occupied housing units that were in the mailback universe. That non-blank questionnaire could come in the form of an actual mail return questionnaire, a Be Counted Form (BCF), an internet return, or a response via Telephone Questionnaire Assistance (TQA).

Methodology

Calculating mail return rates

The source of data for calculating these rates is the Hundred percent Census Edited File with the reinstated housing unit IDs (HCEF_D'). The calculation is restricted to housing units that are in one of the mailback Type of Enumeration Areas (TEAs) - Mailout/Mailback (TEA 1), Update/Leave (TEA 2), Military (TEA 6), Urban Update/Leave (TEA 7), or Mailout/Mailback converted to Update/Leave (TEA 9).

Occupied housing units added during update/leave that were provided with a mailback questionnaire were included. The mail return check-in month and day variable indicates if a given housing unit ID had a corresponding mail return check-in by the time of the late cut for NRFU (April 18, 2000). The final occupancy status variable from the HCEF_D' determines if the housing unit should be counted as part of the return rate. For a detailed discussion of the definition of the Census 2000 mail return rates see Hogan (2000).

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[1]These data have undergone an initial round of edits, but further edits are expected. These results should be considered very preliminary.

Limitations

Some housing units on the HCEF_D' from mailout/mailback and update/leave areas that have a final status of occupied were added after the mailback universe was set. Hence, they are being counted toward the return rate denominator but did not have a chance to respond by mailback equivalent means prior to the late cut for NRFU. This was done in order to be consistent with the calculation of the 1990 Census mail return rates, thus permitting comparisons between the 1990 and 2000 Censuses.

Note that differences in the assignment of housing units to an enumeration methodology between the 1990 Census and Census 2000 have likely accounted for some of the slight reduction in mail return rates. The 1990 Census had more than 10 times the number of housing units in list/enumerate areas, where enumerators compiled the address list and simultaneously collected data from respondents. Thus, list/enumerate housing units were excluded from the 1990 mail return rate calculation. In Census 2000, these housing units were in mailback enumeration areas and included in the mail return rates. These housing units are typically more difficult to locate and enumerate, which could contribute to the slight reduction in mail return rates.

Users of the rates should keep in mind that there will be some noise in the data with respect to the date since the NRFU universe was generated on a flow basis. That is, the NRFU universe of all the housing units was not set instantaneously at midnight of April 18. The actual cut might fall on either side of that date for some housing units.

Results

This table shows Census 2000 mail return rates for the entire United States and for each of the four major regions of the country as defined by the U.S. Census Bureau. The attachment contains these rates at the state level and lists 1990 rates for comparison.

Table 2: Census 2000 Mail Return Rates
National and Regional Data
Preliminary Data

Geography		2000 Mail Return Rate
National		72.0 %
Region	Northeast	71.8 %
	South	69.6 %
	Midwest	76.3 %
	West	71.7 %

- The table shows that the Midwest region had the highest mail return rate (76.3%) and the South had the lowest rate (69.6%).

- Comparisons at the state level between 1990 and 2000 (see attachment) should take into consideration the changes in the method of enumeration. In 1990, approximately 5.7 million housing units were enumerated using List/Enumerate (L/E) methodology, which is not a mailback method and hence is not a component in creating return rates. In 2000, only 500,000 housing units were in L/E areas. Thus, some differences in state rates reflect TEA changes rather than a difference in level of respondent cooperation.

- The three states with the highest 2000 mail return rates (see attachment) were all in the upper Midwest: Wisconsin (80.0%), Iowa (78.9%), and South Dakota (78.9%). In 1990, the highest mail return rates were in Wisconsin (85%), Iowa (84%), and Minnesota (84%).

- The three states with the lowest 2000 mail return rates were Alaska (61.0%), the District of Columbia (65.6%), and South Carolina (66.2%). The lowest mail return rates in 1990 were in Alaska (65%), the District of Columbia (66%), and Nevada (69%).

Nonresponse Followup (NRFU)

Introduction

The Nonresponse Followup (NRFU) is the operation that enumerated housing units in mailback areas for which no questionnaire had been returned prior to the start of the operation. The initial identification of the NRFU workload included housing units for which no questionnaire had been received as of April 10, 2000. Following the initial determination of the NRFU workload, late mail returns (i.e., questionnaires received between April 11, 2000 and April 18, 2000) were identified. Housing units with a late mail return were clerically removed from the NRFU workload in the Local Census Offices (LCO) prior to the start of the field operations.

The NRFU field operations began for most LCOs on April 27, 2000 and were completed by most LCOs by June 26, 2000. In the 1990 Census, the NRFU field operations began on April 26, 1990 and continued until July 30, 1990.

Methodology

Workload Determination

The NRFU universe is comprised of all addresses that could have possibly been included in the NRFU if no questionnaire was received as of April 18, 2000. The NRFU workload consists of all addresses in the NRFU universe for which no completed questionnaire was received as of the April 18 cut off date. The size of the NRFU universe and the NRFU workload is based on information recorded in the Decennial Master Address File (DMAF). All addresses in list/enumerate areas (including remote Alaska) and update/enumerate areas (consisting of both rural and urban areas) were assumed to be ineligible for the NRFU and are not counted in the

NRFU universe. All addresses with a check-in date between April 11 and April 18 were assumed to have been clerically removed from the NRFU workload in the LCOs prior to the start of the NRFU field operations and are not counted in the NRFU workload.

There were a total of 117,916,726 addresses that could possibly be included in the NRFU. From these addresses, 35.4 percent (41,728,393) were included in the NRFU field workload. Addresses included in the NRFU field workload include: 1) all non-deleted addresses on the DMAF as of April 10 that did not have a completed questionnaire checked-in prior to April 18; 2) adds from the post office updates; 3) addresses deleted in the Update/Leave operations; and 4) addresses for questionnaires returned as Undeliverable As Addressed (UAA) and not distributed by the LCO.

Quality Assurance

The QA program for Nonresponse Followup had the following three objectives:

- Prevent errors due to lack of knowledge or understanding on the part of the lister/enumerator.
- Control coverage and content errors.
- Promote continuous improvement of performance.

These objectives were applied to NRFU using a combination of the following three tools. Not every tool was used to meet each objective.

- Questionnaire Review.

    The Crew Leader (CL) reviewed each questionnaire as it was submitted by the enumerator to ensure completion. The CLs made sure the enumerators made a sufficient number of contacts to reduce the number of unresolvable cases. The CLs also made sure the enumerators followed the proper skip pattern to reduce the number of partially completed questionnaires. This review helped minimize unintentional errors made by the enumerators and provided timely feedback to encourage improved enumerator performance.

- Reinterview.

    A separate office staff conducted a review of each enumerator's work to ensure accuracy of data collection (eliminate both intentional and unintentional errors on the part of the enumerator). The OCS2000 selected cases for reinterview via two means – administrative and random. At the start of NRFU, the OCS2000 selected cases randomly for each enumerator. Throughout the NRFU operation, the OCS2000 selected cases administratively based upon a statistical comparison of the characteristics of each enumerator's work to that of the other enumerators in their Crew Leader District (CLD).

    If the characteristics of an enumerator's work were out of tolerance for the CLD, the supervisor entered the enumerator's name into the OCS2000 and the system began

selecting cases for reinterview. Clerks transcribed original information onto a reinterview form for selected reinterview cases. Reinterview staff contacted households by telephone or personal visit to conduct the reinterview. A supervisor reviewed the reinterview results, decided if errors existed, and took the appropriate action. A Field Operations Supervisor (FOS) notified enumerators of performance errors or discrepant results. This method of feedback helped to improve the enumerator's performance.

- Data Entry QA.

   Clerks entered selected fields from each questionnaire into the OCS2000. Clerks "double keyed" three critical fields, and the OCS2000 determined if the two entries matched. The OCS2000 notified clerks if any discrepancies occurred. The clerks took immediate corrective action on all discrepancies. This helped to reduce the unintentional errors by the data entry clerks. This method of immediate feedback also helped to meet the objective of improving performance.

Some limitations of this QA approach are:

- The reinterview program was designed to only detect instances of significant fabrication. If an enumerator did not consistently fabricate, the reinterview program was not likely to identify the discrepant results.

- A five percent sample was the largest workload that the Field Division staff felt could be handled by the LCOs. Available resources, both financial and personnel, limited the amount of reinterview cases that the Local Census Offices were able to complete.

Results

Workloads

Table 3 below shows the US total size of the NRFU universe and the NRFU field workload. State totals of the NRFU universe and field workload are shown in Table A-4. The states are listed in Table A-4 in ascending ordered with respect to the proportion of the NRFU universe included in the NRFU field workload. Generally the states in the Midwest region of the country had the lowest proportions of the NRFU universe included in the NRFU workload. The eight states with the lowest proportions are all in the Midwest region. The five states with the largest proportion of the NRFU universe included in the NRFU field workload were Louisiana , Hawaii, the District of Columbia, South Carolina and Alaska.

Table 3: Nonresponse Followup Workload

	NRFU Universe	NRFU Workload	Percent of NRFU Universe
US Total	117,916,726	41,728,393	35.4

Table 4 below shows the initial outcome for each address in the NRFU. These data reflect the status of each address that was recorded on the questionnaire by the enumerator. These data do not reflect the final status of addresses after the data capture processing.

Table 4: NRFU Interview Outcome

Interview Outcome	Number of Addresses (Percent of NRFU Workload)
Occupied	25,988,521 (62.3)
Vacant	9,754,928 (23.4)
Delete	5,979,600 (14.3)
Unresolved	5,344 (0.0)
Total	41,728,393

Quality Assurance

The following preliminary QA results are available form the Nonresponse Followup program:

- The reinterview workload for NRFU was six percent which is above the expected workload of five percent.

- Discrepant results were found in approximately three percent of the reinterview cases.[2]

Some limitations of the QA data are:

- Some Local Census Offices (LCOs) experienced delays starting up their reinterview programs. These delays may have hindered the reinterviewers' ability to accurately verify census data.

- A significant number of QA forms were lost and/or completed incorrectly. These lost/incorrect forms obstructed our data capture/analysis activities.

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[2]These data have undergone an initial round of edits, but further edit are expected. These results should be considered very preliminary.

Coverage Improvement Followup (CIFU)

Introduction

The NRFU was followed by the Coverage Improvement Followup (CIFU). The CIFU served as a check on addresses found to be vacant or deleted (nonexistent) in the NRFU. Some of the NRFU identified vacant and deleted housing units were excluded from CIFU: housing units identified as vacant or delete in another previous census operation or housing units identified as seasonal vacant during NRFU. It also included addresses requiring followup but which were identified too late to be included in the NRFU. These included addresses added in update/leave operations that were not in NRFU, addresses added from the post office updates that were not in NRFU, addresses added from the Local Update of Census Addresses (LUCA) appeals process that were not in NRFU, addresses with a blank or lost questionnaire, addresses added in an update for new construction, and addresses in the experimental programs.

Methodology

Workload Determination

The addresses included in the CIFU are: 1) addresses that were Vacant or Delete in NRFU, were not a seasonal vacant and were deliverable and not identified as vacant or delete in another previous census operation ; 2) addresses added in update/leave operations that were not in NRFU; 3) addresses added from the post office updates that were not in NRFU; 4) addresses added from the LUCA appeals process that were not in NRFU; 5) addresses with a blank or lost questionnaire; 6) addresses added in an update for new construction; and 7) addresses in the experimental programs. The identification of addresses in the CIFU is based on the DMAF data identifying addresses as belonging to one of these seven categories.

Quality Assurance

The QA program for Coverage Improvement Followup had the following three objectives:

- Prevent errors due to lack of knowledge or understanding on the part of the lister/enumerator.
- Control coverage and content errors.
- Promote continuous improvement of performance.

These objectives were applied to CIFU using a combination of the following three tools. Not every tool was used to meet each objective.

- Questionnaire Review.

  The CL reviewed each questionnaire as it was submitted by the enumerator to ensure completion. The CLs looked at the number of contacts made by the enumerator to reduce

the number of unresolvable cases. This review helped minimize unintentional errors made by the enumerators and provided timely feedback to encourage enumerator performance.

- Dependent Review.

   The only cases eligible for QA were those that were not visited in any previous operation and had a unit status of vacant or delete. The CL or CLA visited each designated HU and verified the HU status and pop count. If unit status or pop count did not match the original information provided by the enumerator, the case was rejected. The CL/CLA completed a blank questionnaire and replaced the rejected one. If the unit status and pop count matched the original information provided by the enumerator, the case was accepted.

   The dependent QA was designed to be completed within the first two weeks of the operation. However, if a fail (reject) decision was made, the CL/CLA continued checking the QA eligible cases with vacant/delete status throughout the remainder of the operation.

- Data Entry QA.

   Clerks entered selected fields from each questionnaire into the OCS2000. Clerks "double keyed" two critical fields, and the OCS2000 determined if the two entries matched. The OCS2000 notified clerks if any discrepancies occurred. The clerks took immediate corrective action on all discrepancies. This helped to reduce the unintentional errors by the data entry clerks. This method of immediate feedback also helped to meet the objective of improving performance.

Some limitations of this QA approach are:

- The Dependent Review was only conducted on housing units identified as vacant or delete. We excluded occupied units due to time and budgetary considerations.

- We designed the QA program with two assistants designated to assist with QA reviews (Questionnaire Review and Dependent Review) per district, but operationally, some districts were allocated only one assistant. Some districts may have had a difficult time completing all of the dependent QA cases.

Results

Workloads

The table below shows a cross tabulation of the addresses included in the CIFU by the outcome of the interview and the reason each address was included in the CIFU.

Table 5: CIFU Workload
Source of Followup by Outcome

Source of Followup (Reason Address is in the CIFU)	CIFU Outcome (Percent)				
	Occupied	Vacant	Delete	Unresolved	Total
Vacant or Delete in NRFU	1,521,059 (23.5)	3,088,989 (47.8)	1,856,459 (28.7)	487 (0.0)	6,466,994 (74.6)
New Construction	100,632 (27.1)	74,304 (20.0)	196,783 (52.9)	11 (0.00)	371,730 (4.3)
Adds from Update/Leave	319,877 (44.6)	278,946 (38.9)	118,265 (16.5)	12 (0.0)	717,100 (8.3)
Lost or Blank Return	190,586 (35.4)	251,430 (46.7)	96,876 (18.0)	22 (0.00)	538,914 (6.2)
Other	182,847 (32.1)	54,801 (9.6)	332,132 (58.3)	10 (0.0)	569,781 (6.6)
Total	2,315,001 (26.7)	3,748,470 (43.3)	2,600,506 (30.0)	542 (0.0)	8,664,519

Quality Assurance

No preliminary results are currently available from the Coverage Improvement Followup program.

Preliminary Results of the Census 2000 Housing Unit ID Inventory Processing

Introduction

The data for this section come from two sources, the Decennial Master Address File (DMAF) and the Hundred percent Census Edited File with the reinstated housing unit IDs included (HCEF_D'). For the *Total* column the numbers were generated using the DMAF. For the *In Census 2000* column the numbers were generated using the HCEF_D'. The number of housing unit IDs removed from Census 2000 was determined by subtracting the number of housing unit IDs in Census 2000 from the total of housing unit IDs.

Housing units were removed from the census process from one of three activities. During the first activity housing units were removed if two independent census operations determined the housing unit not to exist and there was no data capture or if two addresses were determined (matched) to be the same housing unit. The census operations which were involved are block canvassing, questionnaire mailing, questionnaire delivery, nonresponse followup, coverage improvement followup and field verification. The second activity removed some housing units when there was conflicting information concerning the existence of the housing unit; either nonresponse followup or coverage improvement followup determined the housing unit did not exist, however a data capture existed for the housing unit. Rules were established to determine the final status of the housing unit in these cases. Finally, the third activity identified address duplication through a set of expanded address and person matching rules. The housing units identified as duplicates from this process were removed from the census.

Results

The table below contains information on the number and percent of housing units determined not to exist and thus were removed for the nation and the four regions. See the attachment for state level data.

Table 6: Number and Percent of Housing Unit IDs Determined to Not Exist
Housing Unit IDs that removed from Census 2000
National and Regional Data

Geography		Housing Unit IDs			
		Total	In Census 2000	Removed from Census 2000	
				Number	Percent
National		126,276,807	115,904,641	10,372,166	8.2%
Region	Northeast	24,260,015	22,180,440	2,079,575	8.6%
	South	46,216,140	42,382,546	3,833,594	8.3%
	Midwest	29,305,631	26,963,635	2,341,996	8.0%
	West	26,495,021	24,378,020	2,117,001	8.0%

- Data from 1990 are not available

- Nationally 8.2 percent of the housing units in the DMAF were determined not to exist and thus removed

- Regionally between 8.0 and 8.6 percent of the housing units in the DMAF were determined not to exist and thus removed

- At the state level, the percent of housing units in the DMAF that were determined not to exist and thus removed ranged from 5.4 to 16.1 percent

- States with the smallest percent of addresses determined not to exist and removed were Nebraska (5.4 percent), Virginia (5.5 percent), Nevada (5.6 percent), Iowa (5.8 percent) and South Dakota (6.1 percent).

- States with the largest percent of addresses determined not to exist and removed were Louisiana (10.7 percent), Georgia (11.5 percent), Illinois (12.0 percent), South Carolina (12.5 percent) and Hawaii (16.1 percent)

Primary Selection Algorithm

Introduction

The Primary Selection Algorithm (PSA) is applied to a defined subset of response records that have been assigned housing unit (HU) IDs. The purpose of the PSA is to select return and person records that may be included on census files defined by subsequent processes.

More than one response to the census may be received for a given address. This occurs because there are several ways to respond to the census. A person may mail back the census form delivered to his home; he may be interviewed by a census enumerator; he may fill in a Be Counted Form and mail it in; he may fill out a form online and return it via the Internet; he may be enumerated at a group quarters (e.g., a military base) and elect to fill in a different address (i.e., Usual Home Elsewhere (UHE)) at which he thinks he should be counted. Each of these types of responses that arrive for the same housing unit address will create a return coded to the same census ID. It is the job of the PSA to analyze these responses and select from among them the records that it deems most likely to represent the actual census household.

There are two main categories of returns. Standard returns includes mail returns, enumerator returns, internet returns, and Computer Assisted Telephone Interview (CATI) returns. These returns all have census provided information on them which identifies the address the return should enumerate. Other returns such as Be Counted Forms or enumerator returns not pre-printed with address information used for the enumeration of persons who were living at a different address on Census Day or who usually live at a different address other than the one the enumerator visited are called Respondent Provided Address (RPA) returns. There are two types of RPAs; whole household RPAs list all persons in the household while partial household RPAs list one or more persons but not the entire household.

PSA processing is performed one census housing unit at a time. Within each census housing unit, returns with one or more persons in common are combined to form a single PSA Household. Returns that are identified as vacant are combined into one PSA household. If more than one PSA household exists, one household is selected to represent the census housing unit based on a set of criteria. In some instances, person records from another household consisting of partial RPAs, such as Be Counted Forms, may be added to the selected household.

The objective of the PSA is to select the person and return records that best describe the household that lived at the address on Census Day, i.e, the "census household." The PSA should, as much as possible, avoid erroneously enumerating or omitting people when more than one form is returned for a census ID. The benefit of implementing the PSA is a more accurate census count.

Results

Number of Returns and Number of PSA Households Per Census Housing Unit

Multiple returns can be received from one census housing unit. This table shows that a housing unit returned two or more returns 9.46 percent of the time.

Table 7: Census Returns Per Census Housing Unit

Number of returns	Number of housing units (Percent of total)
1	107,305,027 (90.54)
2	10,740,311 (9.06)
3+	473,635 (0.40)
Total	118,518,973

Census Returns Per PSA Household

A PSA household may consist of more than one return. When more than one return is present in a household, PSA designates one return as the "basic" return according to a set of rules. The remaining returns in the PSA household are referred to as "other" returns. Not all census returns are eligible for PSA. Blank returns, enumerator replacement forms and returns for deleted housing units are ineligible to be placed into a PSA household. There were 130,267,656 total census returns of which 2,656,951 were ineligible for PSA. When there were no eligible returns for a housing unit, no PSA household was formed.   This occurred in 0.13 percent of the census housing units.

There were 11,213,946 housing units with more than one return. Over 78 percent of the time, the PSA combined all of the returns in each of these housing units into one PSA household. That is, the PSA determined that only one household was enumerated by all of the returns in each of these housing units.

At housing units with two or more returns there were 22,962,629 census returns of which 13,657,945 were designated as a "basic" return, 6,782,316 were designated as an "other" return and 2,522,368 were ineligible for PSA.

Table 8: Census Returns Per PSA.Household

Number of PSA households	Total housing units (Percent of total)	Total housing units with... (Percent of column total)		
		One return	Two returns	Three or more returns
0 (No eligible returns)	158,530 (0.13)	134,583 (0.13)	22,976 (0.21)	971 (0.21)
1	115,964,314 (97.85)	107,170,444 (99.87)	8,549,216 (79.60)	244,654 (51.65)
2	2,349,988 (1.98)		2,168,119 (20.19)	181,869 (38.40)
3+	46,141 (0.04)			46,141 (9.74)
Total	118,518,973	107,305,027	10,740,311	473,635

Duplicate Returns

When there are at least two returns in a household, the "other" returns may duplicate persons on the "basic" return.   When there is more than one vacant return at an ID, all vacant returns form one PSA household and therefore are treated as duplicates. If all of the persons on an "other" return are on the "basic" return the "other" return is said to be a duplicate of the "basic" return. If an "other" return has at least one person not listed on the "basic" return, it is not a duplicate return. Vacant and occupied duplicates account for 94.37 percent of all "other" eligible returns.

The table below shows the number of eligible "other" returns by the occupancy status of the PSA household.

Table 9: Duplicate Returns in PSA Households Comprised of Two or More Returns

Type of "other" return and occupancy status	Number of "other" returns	Percent of all "other" returns
Vacant Duplicate	2,711,735	39.98
Occupied and Undetermined Status Duplicate*	3,689,141	54.39
Occupied and Undetermined Status Non-Duplicate	381,440	5.63
Total	6,782,216	

* The occupancy status could not be determined for a small fraction of the PSA households

POP Count Changes as a Result of PSA

The household size of the "basic" return determines the minimum size of the PSA household. Persons from "other" returns in the household may be added under certain conditions. These additions may or may not increase the size of the PSA household. The table below shows how often the PSA effected the household size of the PSA households selected at census housing units with two or more returns.

Table 10: PSA Effect on Population Counts

Status of PSA household	Number of census housing units with two or more returns (Percent)
Occupied Household -Addition to household size from 'Other' returns	295,561 (2.63)
Occupied Household -No additions from 'other' returns	7,115,082 (63.45)
Vacant Household	3,756,622 (33.50)
Other Type of Household With or Without Addition*	46,681 (0.42)
Total	11,213,946

* Other types of households are those where the occupied or vacant status could not be determined and housing unit with no eligible returns

The average household size after PSA of census housing units with two or more returns was 2.43 persons. This average included vacant housing units, housing units with undetermined status and housing units with no eligible returns. The increase to the average household size attributed to the inclusion of persons on 'other' returns into the PSA households was 0.04 persons.

Types of PSA Households

The tables below categorize PSA households into four main types: 1) occupied PSA households that are not RPAs, 2) vacant PSA households, 3) whole household RPAs, and 4) partial household RPAs. Again, RPAs include returns such as Be Counted Forms or enumerator returns not pre-printed with address information used for the enumeration of persons who were living at a different address on Census Day or who usually live at a different address other than the one the enumerator visited.   The category type into which each PSA household is placed is determined by the "basic" form for the PSA household.

At housing units where we have two PSA households, this table shows the number of census housing units with each of several combinations of these PSA household types for those housing unit with two PSA households.

Table 11: Number of Census Housing Units with Two PSA
Households by Combination of PSA Household Types

Combination of PSA household types	Number (Percent of census housing units)
Occupied/Occupied	899,060 (38.26)
Occupied/Vacant	1,056,385 (44.95)
Occupied/Whole Household RPA	94,143 (4.01)
Vacant/Whole Household RPA	35,240 (1.50)
Occupied/Partial Household RPA	79,255 (3.37)
Vacant/Partial Household RPA	10,216 (0.43)
All Other Combinations	175,689 (7.48)
Total	2,349,988

This table shows how often the vacant household was selected by PSA over the occupied or Whole Household RPA household within the categories of Occupied/Vacant and Vacant/Whole Household RPA.

Table 12: Housing Status Chosen When a Census Housing Unit Consists of Two PSA Households; one Occupied and one Vacant

Combination of PSA household types	Number of times the vacant household was selected by PSA (Percent of housing units)
Occupied/Vacant	62,255 (5.89)
Vacant/Whole Household RPA	9,438 (26.78)

Item Imputation - Completeness of the Data for Housing Units Only

Introduction

The following preliminary imputation rates consider all cases that were edited, allocated, or substituted according to the Hundred Percent Census Edited File with the reinstated housing unit IDs included (HCEF_D'). The universe for this analysis was restricted to housing units included in the census and persons associated with those housing units. Each housing unit and person record contained a form type variable which was used to determine whether the form of the record was self-administered or enumerator-administered. Self-administered forms are filled out by someone within the housing unit. The different types of self-administered forms include the short and long forms used for mailout/mailback, the short and long forms for update/leave, and Be Counted forms. Enumerator-administered forms are forms filled out by a census enumerator. The form types include the short and long forms for enumerators and the enumerator supplements. Form types that were not logical for this analysis were ignored. These included forms that were used for group quarters enumeration purposes: Individual Census Questionnaires (short and long), Individual Census Reports (short and long), Military Census Reports, and Shipboard Census Reports. These forms included a small number and percent of persons.

The imputation rates for the five items below use the allocation flag variables on the housing unit and person records. Three different types of imputation can occur on each record: edit, allocation, or substitution. An edit is performed when a response for a data item is either missing or not consistent to other responses, and an item value can be determined based on provided information from that same person. Allocations, or computer assignments of acceptable codes in place of unacceptable entries or blanks, are needed most often when an entry for a given item is

lacking or when the information reported for a person or housing unit on that item is inconsistent with other information for that same person or housing unit. This is done by grabbing a response from another person within the household or from a person in a nearby household. A substitution occurs when a full set of characteristics for a person or housing unit needs to be assigned. This happens because a questionnaire contains no information for the household and/or no information for the people within the household. A nearby housing unit with complete information is selected as a substitute and the responses are used to fill the missing data items. This housing unit is selected using a nearest neighbor hot deck.

If the response to an item was unchanged through these imputation procedures, it remained a reported value. However, if the response was modified by editing, allocating, or substituting, then the response was considered to have an imputed value. An imputation rate is then computed by tallying the number of imputed cases and dividing it by the total number of reported and imputed cases combined. Note that the imputation rates reported in other memoranda in this series may not be calculated in the same manner.

The "Total" column in each table represents the overall imputation rate for each specific item. "Self-Administered" in the tables below refers to imputation rates for only self-administered forms. Similarly, "Enumerator-Administered" in the tables refers to imputation rates for only enumerator-administered forms. The "Difference" column refers to the self-administered imputation rate subtracted from the enumerator-administered imputation rate.

Due to the fact that no comparable numbers exist, 1990 imputation rates for the five items below are not provided.

Results

Preliminary Results for Age

Table 13: National and Regional Imputation Rates for Age - Preliminary Data

Geography	Total	Self-administered	Enumerator-administered	Difference
National	7.2	4.5	15.4	10.9
Northeast region	7.6	4.5	16.7	12.2
South region	7.5	4.5	15.6	11.1
Midwest region	5.9	3.6	14.7	11.1
West region	7.7	5.4	14.5	9.1

- The national imputation rate (total) for the age characteristic is 7.2 percent. The self-administered imputation rate is 4.5 percent and the enumerator-administered imputation rate is 15.4 percent. This creates a difference of 10.9 percentage points between enumerator-administered and self-administered rates.

- The Midwest Region has the lowest total (5.9 percent) and self-administered (3.6 percent) imputation rates for age. The Northeast Region carries the highest enumerator-administered imputation rate (16.7 percent), and this causes it to have the highest difference (12.2 percentage points) among the four regions. Similarly, the West Region has the largest self-administered imputation rate (5.4 percent) which causes the smallest difference (9.1 percentage points) among the regions.

- Range for Total (states): 4.6 to 12.2 percent

Lowest:	Highest:
North Dakota (4.6%)	District of Columbia (12.2%)
Iowa (4.8%)	New York (9.2%)
Nebraska (4.8%)	Nevada (8.8%)

- Range for Self-Administered (states): 2.9 to 7.0 percent

Lowest:	Highest:
North Dakota (2.9%)	District of Columbia (7.0%)
Wyoming (3.1%)	California (6.4%)
South Dakota (3.1%)	Hawaii (5.8%)
Wisconsin (3.1%)	
Iowa (3.1%)	

- Range for Enumerator-Administered (states): 10.2 to 23.9 percent

Lowest:	Highest:
West Virginia (10.2%)	District of Columbia (23.9%)
North Dakota (10.2%)	Delaware (21.4%)
South Dakota (10.9%)	Maryland (19.6%)
Alaska (10.9%)	

- Range for Difference (states): 6.2 to 17.4 percentage points

Lowest:	Highest:
West Virginia (6.2%)	Delaware (17.4%)
Alaska (7.2%)	District of Columbia (16.9%)
Utah (7.3%)	Maryland (15.3%)
North Dakota (7.3%)	

- Findings: In all geographies (national, regional, state), the self-administered imputation rates are much lower than the enumerator-administered imputation rates for age.

Preliminary Results for Sex

Table 14: National and Regional Imputation Rates for Sex - Preliminary Data

Geography	Total	Self-administered	Enumerator-administered	Difference
National	3.0	1.8	6.6	4.8
Northeast region	3.2	1.7	7.7	6.0
South region	3.1	1.8	6.6	4.8
Midwest region	2.4	1.4	6.1	4.7
West region	3.4	2.5	6.3	3.8

- The national imputation rate (total) for the sex characteristic is 3.0 percent. The self-administered imputation rate is 1.8 percent and the enumerator-administered imputation rate is 6.6 percent. This creates a difference of 4.8 percentage points between enumerator-administered and self-administered rates.

- The Midwest Region has the lowest total (2.4 percent), self-administered (1.4 percent), and enumerator-administered (6.1 percent) imputation rates of the four regions for the sex characteristic. The West Region has the highest total (3.4 percent) and self-administered (2.5 percent) rates. This high self-administered imputation rate helps create the smallest rate difference (3.8 percentage points) for the West compared to the other three regions. The Northeast Region has the highest enumerator-administered (7.7 percent) imputation rate. The Northeast also has the largest difference (6.0 percentage points) because of its relatively average self-administered rate.

- Range for Total (states): 1.7 to 5.3 percent

Lowest:	Highest:
North Dakota (1.7%)	District of Columbia (5.3%)
Iowa (1.7%)	New York (4.3%)
Nebraska (1.8%)	Arizona (3.9%)
West Virginia (1.8%)	Nevada (3.9%)

- Range for Self-Administered (states): 1.1 to 3.0 percent

Lowest:	Highest:
North Dakota (1.1%)	California (3.0%)
Iowa (1.1%)	District of Columbia (2.8%)
	Hawaii (2.6%)

- Range for Enumerator-Administered (states)s: 2.7 to 11.2 percent

Lowest:	Highest:
West Virginia (2.7%)	District of Columbia (11.2%)
Maine (3.4%)	Delaware (10.9%)
North Dakota (3.6%)	New York (9.8%)
	Maryland (9.8%

- . Range for Difference (states): 1.2 to 9.5 percentage points
  Lowest: Highest:
  West Virginia (1.2%)   Delaware (9.5%)
  Maine (2.1%)   District of Columbia (8.4%)
  Mississippi (2.1%)   Maryland (8.2%)

- Findings: In all geographies (national, regional, state), the self-administered imputation rates are much lower than the enumerator-administered imputation rates for sex.

Preliminary Results for Race

Table 15: National and Regional Imputation Rates for Race - Preliminary Data

Geography	Total	Self-administered	Enumerator-administered	Difference
National	5.0	4.1	7.5	3.4
Northeast region	5.0	3.7	8.7	5.0
South region	4.3	3.3	7.1	3.8
Midwest region	3.3	2.4	6.7	4.3
West region	7.7	7.7	7.7	0.0

- The national imputation rate (total) for the race characteristic is 5.0 percent. The self-administered imputation rate is 4.1 percent and the enumerator-administered imputation rate is 7.5 percent. This creates a difference of 3.4 percentage points between enumerator-administered and self-administered rates.

- The Midwest Region has the lowest total (3.3 percent), self-administered (2.4 percent), and enumerator-administered (6.7 percent) imputation rates for race. By far, the West has the highest total (7.7 percent) imputation rate of the four regions. The West Region also has the highest self-administered (7.7 percent) rate, which is the same as its enumerator-administered rate, thus creating a difference of 0.0 percentage points. The Northeast Region has the highest enumerator-administered (8.7 percent) imputation rate. This causes the Northeast to have the largest rate difference (5.0 percentage points).

- Range for Total (states): 1.9 to 10.0 percent
  Lowest: Highest:
  West Virginia (1.9%)   New Mexico (10.0%)
  North Dakota (2.2%)   California (9.2%)
  Kentucky (2.2%)   Arizona (8.2%)

- Range for Self-Administered (states): 1.5 to 10.5 percent

Lowest:	Highest:
North Dakota (1.5%)	New Mexico (10.5%)
Kentucky (1.6%)	California (9.8%)
West Virginia (1.6%)	Arizona (7.3%)
South Dakota (1.6%)

- Range for Enumerator-Administered (states): 2.6 to 11.9 percent

Lowest:	Highest:
West Virginia (2.6%)	District of Columbia (11.9%)
Kentucky (3.9%)	Delaware (11.4%)
Mississippi (4.1%)	New York (10.8%)

- Range for Difference (states): -2.5 to 9.0 percentage points

Lowest:	Highest:
California (-2.5%)	Delaware (9.0%)
New Mexico (-1.5%)	District of Columbia (8.0%)
West Virginia (1.0%)	Maryland (7.8%)

- Findings: In the national and regional geographies, self-administered imputation rates are lower than enumerator-administered rates for the race characteristic except in one region (West) where the rates are the same. On a state level, all but two states (California and New Mexico) have self-administered imputation rates that are lower than the enumerator-administered rate.

Preliminary Results for Hispanic Origin

Table 16: National and Regional Imputation Rates for Hispanic Origin - Preliminary Data

Geography	Total	Self-administered	Enumerator-administered	Difference
National	5.4	4.6	7.7	3.1
Northeast region	5.6	4.5	8.9	4.4
South region	5.7	5.0	7.4	2.4
Midwest region	4.4	3.8	6.9	3.1
West region	5.8	5.1	7.8	2.7

- The national imputation rate (total) for the Hispanic origin characteristic is 5.4 percent. The self-administered imputation rate is 4.6 percent and the enumerator-administered imputation rate is 7.7 percent. This creates a difference of 3.1 percentage points between enumerator-administered and self-administered rates.

- The Midwest Region has the lowest total (4.4 percent), self-administered (3.8 percent), and enumerator-administered (6.9 percent) imputation rates of all four regions for Hispanic origin. The West has the highest total (5.8 percent) and self-administered (5.1

percent) imputation rates. The Northeast Region carries the highest enumerator-administered (8.9 percent) rate, and this translates into the largest difference (4.4 percentage points) of the four regions.

- Range for Total (states): 3.2 to 9.7 percent

Lowest:	Highest:
Iowa (3.2%)	District of Columbia (9.7%)
Nebraska (3.4%)	Hawaii (7.3%)
North Dakota (3.5%)	New York (7.0%)

- Range for Self-Administered (states): 2.9 to 8.3 percent

Lowest:	Highest:
Iowa (2.9%)	District of Columbia (8.3%)
Nebraska (3.0%)	Mississippi (7.5%)
Vermont (3.0%)	Hawaii (7.0%)

- Range for Enumerator-Administered (states): 2.8 to 13.0 percent

Lowest:	Highest:
West Virginia (2.8%)	District of Columbia (13.0%)
Kentucky (4.0%)	Delaware (11.9%)
Maine (4.3%)	New York (11.0%)

- Range for Difference (states): -2.9 to 6.1 percentage points

Lowest:	Highest:
Mississippi (-2.9%)	Delaware (7.8%)
West Virginia (-2.1%)	Maryland (6.3%)
Kentucky (-0.5%)	Indiana (6.1%)
	Arizona (6.1%)

- Findings: In the national and regional geographies, self-administered imputation rates are lower than enumerator-administered rates in every case for the Hispanic origin characteristic. On a state level, all but four states (Mississippi, West Virginia, Kentucky, and Arkansas) have self-administered imputation rates that are lower than the enumerator-administered rate.

Preliminary Results for Tenure

Table 17: National and Regional Imputation Rates for Tenure - Preliminary Data

Geography	Total	Self-administered	Enumerator-administered	Difference
National	5.3	3.0	12.4	9.4
Northeast region	5.7	3.1	13.1	10.0
South region	5.7	3.1	13.1	10.0
Midwest region	4.7	2.9	12.1	9.2
West region	4.8	2.9	10.5	7.6

- The national imputation rate (total) for the tenure characteristic is 5.3 percent. The self-administered imputation rate is 3.0 percent and the enumerator-administered imputation rate is 12.4 percent. This creates a difference of 9.4 percentage points between enumerator-administered and self-administered rates.

- The Midwest Region has the lowest total (4.7 percent) imputation rate of the four regions for tenure. The Midwest, along with the West Region, have the lowest self-administered imputation rates at 2.9 percent. The West also has the lowest enumerator-administered (10.5 percent) imputation rate as well as the smallest rate difference (7.6 percentage points) of the regions. The Northeast and South Regions carry the same imputation rates for all four categories. Each of these rates is the highest among the regions: total (5.7 percent), self-administered (3.1 percent), enumerator-administered (13.1 percent), and difference (10.0 percentage points).

- Range for Total (states): 3.6 to 8.3 percent

  Lowest:
  Alaska (3.6%)
  Utah (3.7%)
  Ohio (3.9%)

  Highest:
  District of Columbia (8.3%)
  Alabama (7.4%)
  Delaware (6.6%)
  New York (6.6%)

- Range for Self-Administered (states): 2.1 to 4.0 percent

  Lowest:
  Utah (2.1%)
  Colorado (2.4%)

  Highest:
  Mississippi (4.0%)
  Arkansas (3.9%)
  District of Columbia (3.6%)
  Alabama (3.6%)

- Range for Enumerator-Administered (states): 4.7 to 19.4 percent

  Lowest:
  Alaska (4.7%)
  Oregon (8.5%)
  Utah (8.5%)

  Highest:
  Delaware (19.4%)
  District of Columbia (19.2%)
  Alabama (17.5%)

- Range for Difference (states): 1.9 to 16.9 percentage points

Lowest:	Highest:
Alaska (1.9%)	Delaware (16.9%)
Oregon (5.8%)	District of Columbia (15.6%)
West Virginia (5.9%)	Alabama (13.9%)

- Findings: In all geographies (national, regional, state), the self-administered imputation rates are much lower than the enumerator-administered imputation rates for tenure.

Preliminary Findings - Summary

Of all five characteristics, age has the largest national imputation rate (total) and the largest national difference between enumerator-administered and self-administered rates. Both of these seem to be caused by the extremely high enumerator-administered national imputation rates. This could be due to the fact that the age and date of birth items were included in the same question on the enumerator questionnaire. The enumerator may have only asked for the date of birth information to speed up an interview figuring that the age could be computed from a person's date of birth. In a case where the enumerator forgot or incorrectly filled in the age portion of the question after receiving the date of birth, an edit would occur to correctly fill the age field. If edits would not have been included as a type of imputation for this analysis, the national age imputation rate might be lower.

For all five characteristics nationally, the self-administered imputation rates are considerably lower than the enumerator-administered rates.

The Midwest Region has the lowest total imputation rate of the four regions for all five characteristics. This could be attributed to better reporting on the self-administered forms, where the Midwest rates are also ranked as the best in comparison to the other regions.

In general, a state remains consistent across the five characteristics when compared to the other states. That is, a state does not go from having one of the best (low) imputation rates for one characteristic to having the one of the worst (high) imputation rates for another characteristic.

It appears that a state with a lower self-administered imputation rate translates into a lower total imputation rate compared to other states.

When a state has a low enumerator-administered imputation rate, the difference between the self-administered and enumerator-administered rates is also low compared to other states.

References

Hogan, Howard, *Documentation of Response and Return Rates Definitions for Census 2000*, Census 2000 Decision Memorandum No. 111, November 16, 2000.

Rothhaas, Cynthia, *Determining Original Source for the November 2000 Master Address File for Evaluation Purposes* (draft), Planning, Research, and Evaluation Division TXE/2010 Memorandum Series: MAF-EXT-S-01.

Table A-1: Census address list housing unit records, by time of delivery
National and State Data
Preliminary Data

Geography	Total	Pre-Questionnaire Delivery Operations		Questionnaire Delivery		Post-Questionnaire Delivery Operations		Operation Undetermined	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Nation	128,691,771	124,405,492	96.7	2,316,379	1.8	1,737,311	1.3	381,597	0.3
State									
Alabama	2,226,880	2,132,891	95.8	56,913	2.6	33,863	1.5	3,213	0.1
Alaska	290,803	243,154	83.6	40,035	13.8	6,048	2.1	1,566	0.5
Arizona	2,442,284	2,304,295	94.4	88,917	3.6	32,504	1.3	16,568	0.7
Arkansas	1,311,772	1,246,236	95.0	49,131	3.7	13,691	1.0	2,714	0.2
California	13,413,871	13,136,059	97.9	102,570	0.8	135,847	1.0	39,395	0.3
Colorado	1,986,641	1,909,776	96.1	46,877	2.4	22,677	1.1	7,311	0.4
Connecticut	1,517,176	1,489,112	98.2	5,256	0.3	16,450	1.1	6,358	0.4
Delaware	370,219	362,352	97.9	4,222	1.1	3,059	0.8	586	0.2
District of Columbia	296,878	293,139	98.7	216	0.1	2,465	0.8	1,058	0.4
Florida	8,187,877	7,962,003	97.2	79,992	1.0	119,402	1.5	26,480	0.3
Georgia	3,932,790	3,785,927	96.3	75,213	1.9	62,849	1.6	8,801	0.2
Hawaii	550,586	534,174	97.0	6,334	1.2	8,224	1.5	1,854	0.3
Idaho	596,053	563,363	94.5	13,643	2.3	16,362	2.7	2,685	0.5

State								
Illinois	5,658,489	5,527,505	97.7	24,152	0.4	92,251	1.6	14,581	0.3
Indiana	2,837,223	2,771,365	97.7	15,915	0.6	43,570	1.5	6,373	0.2
Iowa	1,328,772	1,292,255	97.3	19,950	1.5	11,969	0.9	4,598	0.3
Kansas	1,231,192	1,200,987	97.5	15,537	1.3	10,128	0.8	4,540	0.4
Kentucky	1,945,361	1,865,041	95.9	50,695	2.6	24,428	1.3	5,197	0.3
Louisiana	2,099,677	2,024,809	96.4	43,540	2.1	27,555	1.3	3,773	0.2
Maine	709,305	605,174	85.3	96,414	13.6	6,492	0.9	1,225	0.2
Maryland	2,320,497	2,279,455	98.2	11,621	0.5	24,438	1.1	4,983	0.2
Massachusetts	2,848,405	2,795,723	98.2	11,117	0.4	29,957	1.1	11,608	0.4
Michigan	4,614,720	4,518,406	97.9	38,869	0.8	46,038	1.0	11,407	0.2
Minnesota	2,250,915	2,190,012	97.3	32,011	1.4	21,470	1.0	7,422	0.3
Mississippi	1,308,752	1,242,006	94.9	36,217	2.8	26,348	2.0	4,181	0.3
Missouri	2,694,326	2,613,950	97.0	52,139	1.9	20,335	0.8	7,902	0.3
Montana	452,085	413,885	91.6	31,839	7.0	4,064	0.9	2,297	0.5
Nebraska	774,108	751,588	97.1	13,276	1.7	5,828	0.8	3,416	0.4
Nevada	883,053	819,592	92.8	39,772	4.5	19,095	2.2	4,594	0.5
New Hampshire	591,273	525,388	88.9	57,592	9.7	6,982	1.2	1,311	0.2
New Jersey	3,605,986	3,540,202	98.2	7,979	0.2	47,795	1.3	10,010	0.3
New Mexico	880,622	816,500	92.7	49,074	5.6	11,219	1.3	3,829	0.4

State								
New York	8,651,115	8,342,982	96.4	123,570	1.4	156,730	1.8	27,833	0.3
North Carolina	3,929,467	3,733,073	95.0	124,465	3.2	62,622	1.6	9,307	0.2
North Dakota	316,042	300,302	95.0	11,986	3.8	2,314	0.7	1,440	0.5
Ohio	5,164,457	5,068,491	98.1	24,216	0.5	57,657	1.1	14,093	0.3
Oklahoma	1,653,495	1,589,931	96.2	43,713	2.6	14,812	0.9	5,039	0.3
Oregon	1,615,538	1,558,865	96.5	17,996	1.1	29,775	1.8	8,902	0.6
Pennsylvania	5,800,967	5,672,719	97.8	54,049	0.9	62,182	1.1	12,017	0.2
Rhode Island	480,124	471,304	98.2	2,612	0.5	5,246	1.1	962	0.2
South Carolina	2,040,919	1,951,367	95.6	55,188	2.7	29,323	1.4	5,041	0.2
South Dakota	350,536	330,338	94.2	15,105	4.3	3,475	1.0	1,618	0.5
Tennessee	2,733,483	2,617,135	95.7	58,628	2.1	48,355	1.8	9,365	0.3
Texas	8,914,555	8,560,484	96.0	194,945	2.2	133,146	1.5	25,980	0.3
Utah	960,599	920,122	95.8	24,665	2.6	13,435	1.4	2,377	0.2
Vermont	340,658	281,224	82.6	54,689	16.1	4,153	1.2	592	0.2
Virginia	3,156,582	3,058,381	96.9	59,422	1.9	31,098	1.0	7,681	0.2
Washington	2,734,044	2,662,041	97.4	18,356	0.7	46,177	1.7	7,470	0.3
West Virginia	915,375	874,035	95.5	32,281	3.5	8,309	0.9	750	0.1
Wisconsin	2,529,565	2,457,760	97.2	28,663	1.1	35,462	1.4	7,680	0.3
Wyoming	245,659	198,614	80.8	43,627	17.8	2,100	0.9	1,318	0.5

Table A-2: Census address list housing unit records, by TEA
National, Regional and State Data
Preliminary Data

Geography		Total	Mailout/Mailback		Update/Leave		Update/Enumerate		List/Enumerate	
			Number	Percent	Number	Percent	Number	Percent	Number	Percent
National		128,691,771	102,975,788	80.0	24,209,899	18.8	1,079,039	0.8	422,533	0.3
Region	Northeast	24,545,009	20,843,333	84.9	3,249,315	13.2	234,816	1.0	217,349	0.9
	South	47,344,579	34,314,575	72.5	12,753,381	26.9	258,087	0.5	15,475	0.0
	Midwest	29,750,345	24,604,228	82.7	4,976,606	16.7	156,800	0.5	11,981	0.0
	West	27,051,838	23,213,652	85.8	3,230,597	11.9	429,336	1.6	177,728	0.7
State	Alabama	2,226,880	1,410,080	63.3	805,427	36.2	11,183	0.5	0	0.0
	Alaska	290,803	172,492	59.3	87,551	30.1	143	0.0	30,606	10.5
	Arizona	2,442,284	1,889,217	77.4	435,681	17.8	91,304	3.7	26,075	1.1
	Arkansas	1,311,772	560,609	42.7	751,096	57.3	0	0.0	0	0.0
	California	13,413,871	12,647,608	94.3	621,540	4.6	108,608	0.8	35,823	0.3
	Colorado	1,986,641	1,448,075	72.9	500,435	25.2	38,097	1.9	0	0.0
	Connecticut	1,517,176	1,419,202	93.5	97,865	6.5	103	0.0	0	0.0
	Delaware	370,219	299,677	80.9	70,540	19.1	0	0.0	0	0.0
	District of Columbia	296,878	296,569	99.9	307	0.1	0	0.0	0	0.0
	Florida	8,187,877	7,439,287	90.9	680,397	8.3	68,016	0.8	0	0.0

State	Total	Number	%	Number	%	Number	%	Number	%
Georgia	3,932,790	2,885,121	73.4	1,047,193	26.6	0	0.0	0	0.0
Hawaii	550,586	459,813	83.5	90,561	16.4	0	0.0	208	0.0
Idaho	596,053	471,346	79.1	105,433	17.7	15,762	2.6	3,503	0.6
Illinois	5,658,489	5,216,579	92.2	441,885	7.8	0	0.0	0	0.0
Indiana	2,837,223	2,574,052	90.7	255,773	9.0	7,319	0.3	0	0.0
Iowa	1,328,772	861,298	64.8	467,131	35.2	270	0.0	0	0.0
Kansas	1,231,192	896,422	72.8	332,012	27.0	2,726	0.2	0	0.0
Kentucky	1,945,361	1,176,201	60.5	751,877	38.6	16,541	0.9	0	0.0
Louisiana	2,099,677	1,457,524	69.4	618,691	29.5	23,432	1.1	0	0.0
Maine	709,305	242,656	34.2	382,758	54.0	8,558	1.2	75,315	10.6
Maryland	2,320,497	2,107,801	90.8	212,680	9.2	0	0.0	0	0.0
Massachusetts	2,848,405	2,709,678	95.1	64,499	2.3	74,213	2.6	0	0.0
Michigan	4,614,720	3,925,949	85.1	688,567	14.9	0	0.0	0	0.0
Minnesota	2,250,915	1,629,836	72.4	605,334	26.9	15,684	0.7	0	0.0
Mississippi	1,308,752	804,767	61.5	501,628	38.3	2,134	0.2	0	0.0
Missouri	2,694,326	1,825,542	67.8	868,706	32.2	0	0.0	0	0.0
Montana	452,085	120,220	26.6	292,853	64.8	30,203	6.7	8,794	1.9
Nebraska	774,108	532,258	68.8	233,988	30.2	3,708	0.5	4,025	0.5
Nevada	883,053	637,566	72.2	201,446	22.8	26,041	2.9	17,989	2.0

State								
New Hampshire	591,273	331,810	56.1	214,966	36.4	0	0.0	44,490	7.5
New Jersey	3,605,986	3,491,388	96.8	114,582	3.2	0	0.0	0	0.0
New Mexico	880,622	475,244	54.0	325,224	36.9	73,669	8.4	6,454	0.7
New York	8,651,115	7,444,315	86.1	1,098,908	12.7	51,878	0.6	55,949	0.6
North Carolina	3,929,467	2,136,764	54.4	1,769,097	45.0	23,288	0.6	0	0.0
North Dakota	316,042	148,157	46.9	146,141	46.2	17,826	5.6	3,913	1.2
Ohio	5,164,457	4,681,877	90.7	482,566	9.3	0	0.0	0	0.0
Oklahoma	1,653,495	977,768	59.1	675,669	40.9	0	0.0	0	0.0
Oregon	1,615,538	1,448,967	89.7	162,227	10.0	2,552	0.2	1,770	0.1
Pennsylvania	5,800,967	4,700,176	81.0	1,002,317	17.3	98,411	1.7	0	0.0
Rhode Island	480,124	405,297	84.4	73,172	15.2	1,653	0.3	0	0.0
South Carolina	2,040,919	1,425,636	69.9	607,102	29.7	8,121	0.4	0	0.0
South Dakota	350,536	163,816	46.7	158,532	45.2	24,141	6.9	4,043	1.2
Tennessee	2,733,483	1,998,956	73.1	734,442	26.9	0	0.0	0	0.0
Texas	8,914,555	6,871,834	77.1	1,921,557	21.6	105,342	1.2	15,475	0.2
Utah	960,599	766,229	79.8	161,535	16.8	25,285	2.6	7,526	0.8
Vermont	340,658	98,811	29.0	200,248	58.8	0	0.0	41,595	12.2
Virginia	3,156,582	2,213,654	70.1	942,710	29.9	30	0.0	0	0.0
Washington	2,734,044	2,547,906	93.2	179,348	6.6	6,642	0.2	86	0.0

West Virginia	915,375	252,327	27.6	662,968	72.4	0	0.0	0	0.0
Wisconsin	2,529,565	2,148,442	84.9	295,971	11.7	85,126	3.4	0	0.0
Wyoming	245,659	128,969	52.5	66,763	27.2	11,030	4.5	38,894	15.8

Mailout/Mailback = TEAs 1 and 6
Update/Leave = TEAs 2, 7 and 9
Update/Enumerate = TEAs 5 and 8
List/Enumerate = TEAs 3 and 4

Note: The complete counts by TEA contain a certain number of address records that have been merged with other address records and now contain no TEA information. These numbers are not shown here but would make the remaining numbers in the table sum to the totals shown.

**Table A-3: Comparison of the 1990 and 2000 Censuses
Mail Return Rates
National and State Data
Preliminary Data**

	Geography	1990 Mail Return Rates	2000 Mail Return Rates	Difference between 2000 and 1990 Mail Return Rates
National		74%	72.0%	-2.0%
State	Alabama	72%	67.6%	-4.4%
	Alaska	65%	61.0%	-4.0%
	Arizona	74%	70.0%	-4.0%
	Arkansas	76%	69.9%	-6.1%
	California	72%	72.6%	0.6%
	Colorado	77%	73.9%	-3.1%
	Connecticut	73%	73.4%	0.4%
	Delaware	76%	71.1%	-4.9%
	District of Columbia	66%	65.6%	-0.4%
	Florida	74%	71.2%	-2.8%
	Georgia	73%	70.4%	-2.6%
	Hawaii	70%	67.5%	-2.5%
	Idaho	77%	72.5%	-4.5%
	Illinois	77%	72.8%	-4.2%
	Indiana	81%	74.0%	-7.0%
	Iowa	84%	78.9%	-5.1%
	Kansas	81%	74.8%	-6.2%
	Kentucky	79%	70.4%	-8.6%
	Louisiana	71%	66.8%	-4.2%
	Maine	73%	70.0%	-3.0%
	Maryland	77%	72.8%	-4.2%
	Massachusetts	72%	72.7%	0.7%

State			
Michigan	80%	78.1%	-1.9%
Minnesota	84%	78.4%	-5.6%
Mississippi	72%	67.5%	-4.5%
Missouri	80%	75.6%	-4.4%
Montana	75%	74.0%	-1.0%
Nebraska	81%	78.7%	-2.3%
Nevada	69%	68.2%	-0.8%
New Hampshire	75%	72.4%	-2.6%
New Jersey	75%	72.7%	-2.3%
New Mexico	72%	67.3%	-4.7%
New York	72%	68.4%	-3.6%
North Carolina	73%	68.1%	-4.9%
North Dakota	81%	78.4%	-2.6%
Ohio	82%	76.6%	-5.4%
Oklahoma	77%	69.9%	-7.1%
Oregon	74%	71.7%	-2.3%
Pennsylvania	81%	75.8%	-5.2%
Rhode Island	72%	71.3%	-0.7%
South Carolina	70%	66.2%	-3.8%
South Dakota	81%	78.9%	-2.1%
Tennessee	73%	69.4%	-3.6%
Texas	74%	67.7%	-6.3%
Utah	75%	72.2%	-2.8%
Vermont	70%	68.6%	-1.4%
Virginia	78%	74.1%	-3.9%
Washington	75%	69.8%	-5.2%
West Virginia	77%	71.4%	-5.6%
Wisconsin	85%	80.0%	-5.0%
Wyoming	74%	73.2%	-0.8%

Table A-4: Nonresponse Followup Workload

State	NRFU Universe	NRFU Workload	Percent of NRFU Universe	Region
US Total	117916726	41728393	35.4	
IA	1254504	337374	26.9	Midwest
NE	725835	201758	27.8	Midwest
WI	2307344	647615	28.1	Midwest
SD	300372	85627	28.5	Midwest
MN	2091857	596917	28.5	Midwest
OH	4933825	1495049	30.3	Midwest
ND	276078	84582	30.6	Midwest
MI	4350287	1355780	31.2	Midwest
VA	2937622	916909	31.2	South
KS	1154224	369367	32.0	Midwest
CO	1809049	583193	32.2	West
PA	5356326	1730546	32.3	Northeast
CA	12479096	4092714	32.8	West
CT	1438792	473774	32.9	Northeast
MO	2502097	826337	33.0	Midwest
MA	2648279	879213	33.2	Northeast
IL	5071388	1705872	33.6	Midwest
IN	2627107	884833	33.7	Midwest

Table A-4: Nonresponse Followup Workload

State	NRFU Universe	NRFU Workload	Percent of NRFU Universe	Region
MD	2203779	747536	33.9	South
MT	375376	127995	34.1	West
NJ	3428279	1179941	34.4	Northeast
UT	762675	265864	34.9	West
OR	1493717	525075	35.2	West
RI	452956	159345	35.2	Northeast
NH	509283	180149	35.4	Northeast
ID	522459	188317	36.0	West
WY	182983	67017	36.6	West
NV	780343	286008	36.7	West
KY	1772082	649634	36.7	South
WA	2541696	935441	36.8	.West
GA	3427442	1280935	37.4	South
TN	2515515	948374	37.7	South
WV	854624	323250	37.8	South
AR	1192804	454673	38.1	South
OK	1537777	589801	38.4	South
AZ	2118544	818468	38.6	West
FL	7437751	2887968	38.8	South
TX	8128827	3162948	38.9	South

Table A-4: Nonresponse Followup Workload

State	NRFU Universe	NRFU Workload	Percent of NRFU Universe	Region
NC	3558262	1394858	39.2	South
NY	7973202	3129981	39.3	Northeast
DE	355909	140176	39.4	South
MS	1190079	477446	40.1	South
NM	718643	292623	40.7	West
ME	573833	237280	41.4	Northeast
AL	2024441	839046	41.4	South
VT	256451	107894	42.1	Northeast
LA	1916653	810111	42.3	South
HI	483671	207698	42.9	West
DC	288198	124186	43.1	South
SC	1839223	810189	44.1	South
AK	235167	110706	47.1	West

Table A-5: Number and Percent of Housing Unit IDs Determined Not to Exist
Housing Unit IDs removed from Census 2000
National and State Data
Preliminary Data

Geography		Housing Unit IDs			
		Total	In Census 2000	Removed from Census 2000	
				Number	Percent
National		126,276,807	115,904,641	10,372,166	8.2%
State	Alabama	2,179,657	1,963,711	215,946	9.9%
	Alaska	288,265	260,978	27,287	9.5%
	Arizona	2,417,314	2,189,189	228,125	9.4%
	Arkansas	1,274,650	1,173,043	101,607	8.0%
	California	13,107,542	12,214,549	892,993	6.8%
	Colorado	1,965,768	1,808,037	157,731	8.0%
	Connecticut	1,504,421	1,385,975	118,446	7.9%
	Delaware	368,409	343,072	25,337	6.9%
	District of Columbia	295,182	274,845	20,337	6.9%
	Florida	7,937,571	7,302,947	634,624	8.0%
	Georgia	3,708,750	3,281,737	427,013	11.5%
	Hawaii	548,960	460,542	88,418	16.1%
	Idaho	585,802	527,824	57,978	9.9%
	Illinois	5,552,854	4,885,615	667,239	12.0%
	Indiana	2,794,737	2,532,319	262,418	9.4%
	Iowa	1,309,034	1,232,511	76,523	5.8%
	Kansas	1,210,025	1,131,200	78,825	6.5%
	Kentucky	1,905,170	1,750,926	154,244	8.1%
	Louisiana	2,068,967	1,847,181	221,786	10.7%
	Maine	695,097	651,901	43,196	6.2%
	Maryland	2,292,693	2,145,283	147,410	6.4%

Massachusetts	2,832,183	2,621,989	210,194	7.4%
Michigan	4,547,229	4,234,279	312,950	6.9%
Minnesota	2,211,912	2,065,946	145,966	6.6%
Mississippi	1,284,940	1,161,953	122,987	9.6%
Missouri	2,643,651	2,442,017	201,634	7.6%
Montana	443,108	412,633	30,475	6.9%
Nebraska	763,849	722,668	41,181	5.4%
Nevada	876,797	827,457	49,340	5.6%
New Hampshire	583,474	547,024	36,450	6.2%
New Jersey	3,579,895	3,310,275	269,620	7.5%
New Mexico	868,605	780,579	88,026	10.1%
New York	8,529,607	7,679,307	850,300	10.0%
North Carolina	3,857,390	3,523,944	333,446	8.6%
North Dakota	311,631	289,677	21,954	7.0%
Ohio	5,112,651	4,783,051	329,600	6.4%
Oklahoma	1,621,526	1,514,400	107,126	6.6%
Oregon	1,597,106	1,452,709	144,397	9.0%
Pennsylvania	5,732,579	5,249,750	482,829	8.4%
Rhode Island	478,179	439,837	38,342	8.0%
South Carolina	2,003,324	1,753,670	249,654	12.5%
South Dakota	344,216	323,208	21,008	6.1%
Tennessee	2,690,789	2,439,444	251,345	9.3%
Texas	8,751,308	8,157,575	593,733	6.8%
Utah	854,198	768,594	85,604	10.0%
Vermont	324,580	294,382	30,198	9.3%
Virginia	3,071,978	2,904,192	167,786	5.5%
Washington	2,698,712	2,451,075	247,637	9.2%
West Virginia	903,836	844,623	59,213	6.6%
Wisconsin	2,503,842	2,321,144	182,698	7.3%
Wyoming	242,844	223,854	18,990	7.8%

Table A-6: Imputation Rates for Age
National and State Data
Preliminary Data

Geography		Total	Self-Administered	Enumerator-Administered	Difference
National		7.2	4.5	15.4	10.9
State	Alabama	8.1	4.5	17.3	12.8
	Alaska	6.5	3.7	10.9	7.2
	Arizona	8.6	4.8	17.3	12.5
	Arkansas	6.6	4.4	12.8	8.4
	California	8.3	6.4	14.2	7.8
	Colorado	6.7	3.8	16.8	13.0
	Connecticut	6.6	4.2	14.6	10.4
	Delaware	8.4	4.0	21.4	17.4
	District of Columbia	12.2	7.0	23.9	16.9
	Florida	7.9	4.6	17.1	12.5
	Georgia	8.2	4.9	18.3	13.4
	Hawaii	8.6	5.8	15.3	9.5
	Idaho	5.8	3.6	12.2	8.6
	Illinois	7.6	4.4	18.2	13.8
	Indiana	6.6	3.3	17.9	14.6
	Iowa	4.8	3.1	12.7	9.6
	Kansas	5.7	3.5	13.6	10.1
	Kentucky	5.7	3.7	11.5	7.8
	Louisiana	7.5	4.6	14.2	9.6
	Maine	6.1	3.4	12.1	8.7
	Maryland	7.9	4.3	19.6	15.3
	Massachusetts	6.7	4.3	14.1	9.8
	Michigan	5.6	3.9	13.4	9.5

Minnesota	5.1	3.3	13.9	10.6
Mississippi	7.5	5.3	13.2	7.9
Missouri	5.4	3.6	12.6	9.0
Montana	5.5	3.4	11.4	8.0
Nebraska	4.8	3.2	12.1	8.9
Nevada	8.8	5.0	17.4	12.4
New Hampshire	6.4	3.4	14.9	11.5
New Jersey	7.5	4.6	16.7	12.1
New Mexico	7.9	4.3	14.6	10.3
New York	9.2	5.4	18.8	13.4
North Carolina	7.0	4.3	14.3	10.0
North Dakota	4.6	2.9	10.2	7.3
Ohio	5.3	3.6	12.0	8.4
Oklahoma	6.0	3.9	12.3	8.4
Oregon	6.0	3.9	12.2	8.3
Pennsylvania	6.3	3.8	15.5	11.7
Rhode Island	7.6	4.3	17.3	13.0
South Carolina	7.5	4.4	15.0	10.6
South Dakota	4.9	3.1	10.9	7.8
Tennessee	6.7	4.1	14.0	9.9
Texas	8.1	4.9	15.9	11.0
Utah	5.9	4.1	11.4	7.3
Vermont	6.7	3.3	13.6	10.3
Virginia	6.1	3.9	14.1	10.2
Washington	6.7	3.9	14.4	10.5
West Virginia	5.5	4.0	10.2	6.2
Wisconsin	5.3	3.1	15.7	12.6
Wyoming	6.4	3.1	12.0	8.9

Table A-7: Imputation Rates for Sex
National and State Data
Preliminary Data

Geography		Total	Self-Administered	Enumerator-Administered	Difference
National		3.0	1.8	6.6	4.8
State	Alabama	3.4	1.7	7.7	6.0
	Alaska	2.9	1.4	5.1	3.7
	Arizona	3.9	2.0	8.3	6.3
	Arkansas	2.4	1.7	4.6	2.9
	California	3.8	3.0	6.1	3.1
	Colorado	2.9	1.6	7.3	5.7
	Connecticut	2.5	1.4	6.0	4.6
	Delaware	3.8	1.4	10.9	9.5
	District of Columbia	5.3	2.8	11.2	8.4
	Florida	3.1	1.8	6.8	5.0
	Georgia	3.5	2.0	8.0	6.0
	Hawaii	3.7	2.6	6.4	3.8
	Idaho	2.4	1.5	5.1	3.6
	Illinois	3.4	1.8	8.5	6.7
	Indiana	2.9	1.3	8.7	7.4
	Iowa	1.7	1.1	4.3	3.2
	Kansas	2.0	1.3	4.6	3.3
	Kentucky	2.0	1.4	3.8	2.4
	Louisiana	3.1	1.8	6.0	4.2
	Maine	2.0	1.3	3.4	2.1
	Maryland	3.5	1.6	9.8	8.2
	Massachusetts	2.5	1.5	5.6	4.1
	Michigan	2.2	1.5	5.0	3.5
	Minnesota	2.0	1.3	5.3	4.0

Mississippi	2.8	2.2	4.3	2.1
Missouri	2.0	1.4	4.5	3.1
Montana	2.2	1.4	4.3	2.9
Nebraska	1.8	1.2	4.4	3.2
Nevada	3.9	2.2	7.9	5.7
New Hampshire	2.7	1.2	6.7	5.5
New Jersey	3.1	1.7	7.4	5.7
New Mexico	3.6	1.8	7.1	5.3
New York	4.3	2.1	9.8	7.7
North Carolina	2.6	1.7	5.3	3.6
North Dakota	1.7	1.1	3.6	2.5
Ohio	1.9	1.3	4.2	2.9
Oklahoma	2.1	1.5	4.1	2.6
Oregon	2.3	1.5	4.7	3.2
Pennsylvania	2.4	1.4	6.2	4.8
Rhode Island	3.2	1.5	8.2	6.7
South Carolina	3.2	1.7	6.8	5.1
South Dakota	1.9	1.2	4.3	3.1
Tennessee	2.5	1.5	5.3	3.8
Texas	3.6	2.1	7.3	5.2
Utah	2.5	1.8	4.7	2.9
Vermont	2.7	1.2	5.7	4.5
Virginia	2.5	1.5	6.0	4.5
Washington	2.7	1.6	5.6	4.0
West Virginia	1.8	1.5	2.7	1.2
Wisconsin	2.2	1.2	7.0	5.8
Wyoming	3.0	1.2	6.1	4.9

Table A-8: Imputation Rates for Race
National and State Data
Preliminary Data

Geography		Total	Self-Administered	Enumerator-Administered	Difference
National		5.0	4.1	7.5	3.4
State	Alabama	3.5	1.9	7.8	5.9
	Alaska	4.1	3.1	5.8	2.7
	Arizona	8.2	7.3	10.3	3.0
	Arkansas	2.9	2.3	4.7	2.4
	California	9.2	9.8	7.3	-2.5
	Colorado	6.4	5.4	9.7	4.3
	Connecticut	4.4	3.6	7.3	3.7
	Delaware	4.7	2.4	11.4	9.0
	District of Columbia	6.3	3.9	11.9	8.0
	Florida	4.2	3.0	7.5	4.5
	Georgia	4.2	2.8	8.3	5.5
	Hawaii	5.9	5.4	7.2	1.8
	Idaho	4.2	3.5	6.2	2.7
	Illinois	5.3	4.1	9.2	5.1
	Indiana	3.7	2.0	9.4	7.4
	Iowa	2.4	1.9	5.0	3.1
	Kansas	3.5	2.9	5.7	2.8
	Kentucky	2.2	1.6	3.9	2.3
	Louisiana	3.2	2.1	5.8	3.7
	Maine	2.5	1.7	4.2	2.5
	Maryland	4.3	2.5	10.3	7.8
	Massachusetts	4.2	3.3	7.1	3.8
	Michigan	2.9	2.3	5.6	3.3
	Minnesota	2.8	2.1	6.5	4.4

Mississippi	2.7	2.2	4.1	1.9
Missouri	2.5	1.9	4.7	2.8
Montana	3.1	2.2	5.4	3.2
Nebraska	2.8	2.3	4.8	2.5
Nevada	7.4	6.5	9.3	2.8
New Hampshire	3.6	2.1	8.1	6.0
New Jersey	5.1	4.1	8.2	4.1
New Mexico	10.0	10.5	9.0	-1.5
New York	6.7	5.1	10.8	5.7
North Carolina	3.2	2.3	5.6	3.3
North Dakota	2.2	1.5	4.4	2.9
Ohio	2.3	1.8	4.3	2.5
Oklahoma	3.2	2.5	4.9	2.4
Oregon	4.1	3.5	6.0	2.5
Pennsylvania	3.3	2.4	6.8	4.4
Rhode Island	4.8	3.3	9.3	6.0
South Carolina	3.4	2.0	6.8	4.8
South Dakota	2.3	1.6	4.5	2.9
Tennessee	2.8	1.8	5.5	3.7
Texas	7.3	6.7	8.6	1.9
Utah	4.3	3.8	5.7	1.9
Vermont	3.2	1.7	6.5	4.8
Virginia	3.3	2.3	6.9	4.6
Washington	4.8	3.9	7.2	3.3
West Virginia	1.9	1.6	2.6	1.0
Wisconsin	3.3	2.2	8.1	5.9
Wyoming	4.5	3.0	7.1	4.1

Table A-9: Imputation Rates for Hispanic Origin
National and State Data
Preliminary Data

Geography	Total	Self-Administered	Enumerator-Administered	Difference
National	5.4	4.6	7.7	3.1
State				
Alabama	6.5	5.8	8.4	2.6
Alaska	4.7	3.9	5.9	2.0
Arizona	6.0	4.1	10.2	6.1
Arkansas	5.2	5.2	4.9	-0.3
California	6.2	5.9	7.4	1.5
Colorado	5.1	3.8	9.7	5.9
Connecticut	4.6	3.8	7.3	3.5
Delaware	6.1	4.1	11.9	7.8
District of Columbia	9.7	8.3	13.0	4.7
Florida	5.3	4.4	8.0	3.6
Georgia	6.6	5.9	8.6	2.7
Hawaii	7.3	7.0	8.1	1.1
Idaho	3.9	3.2	6.2	3.0
Illinois	5.5	4.3	9.3	5.0
Indiana	4.9	3.5	9.6	6.1
Iowa	3.2	2.9	5.0	2.1
Kansas	3.9	3.3	5.9	2.6
Kentucky	4.4	4.5	4.0	-0.5
Louisiana	6.1	6.0	6.2	0.2
Maine	3.6	3.4	4.3	0.9
Maryland	6.0	4.6	10.9	6.3
Massachusetts	4.8	3.9	7.3	3.4
Michigan	4.5	4.2	6.0	1.8
Minnesota	3.8	3.2	6.7	3.5

State			
Mississippi	6.7	7.5	4.6	-2.9
Missouri	4.1	4.0	4.9	0.9
Montana	4.2	3.6	5.6	2.0
Nebraska	3.4	3.0	5.0	2.0
Nevada	6.1	4.6	9.5	4.9
New Hampshire	4.4	3.1	8.2	5.1
New Jersey	5.4	4.4	8.4	4.0
New Mexico	6.5	4.9	9.3	4.4
New York	7.0	5.4	11.0	5.6
North Carolina	5.3	5.1	5.8	0.7
North Dakota	3.5	3.2	4.7	1.5
Ohio	4.0	3.9	4.6	0.7
Oklahoma	4.5	4.2	5.2	1.0
Oregon	4.1	3.5	6.0	2.5
Pennsylvania	4.6	4.0	7.1	3.1
Rhode Island	5.3	3.8	9.4	5.6
South Carolina	6.3	6.0	7.3	1.3
South Dakota	3.6	3.2	5.2	2.0
Tennessee	5.1	4.9	5.7	0.8
Texas	5.9	4.8	8.6	3.8
Utah	4.0	3.4	5.9	2.5
Vermont	4.2	3.0	6.7	3.7
Virginia	5.2	4.7	7.2	2.5
Washington	5.0	4.2	7.3	3.1
West Virginia	4.4	4.9	2.8	-2.1
Wisconsin	4.1	3.2	8.3	5.1
Wyoming	4.6	3.1	7.2	4.1

Table A-10: Imputation Rates for Tenure
National and State Data
Preliminary Data

Geography		Total	Self-Administered	Enumerator-Administered	Difference
National		5.3	3.0	12.4	9.4
State	Alabama	7.4	3.6	17.5	13.9
	Alaska	3.6	2.8	4.7	1.9
	Arizona	6.1	2.8	14.5	11.7
	Arkansas	6.0	3.9	12.4	8.5
	California	4.7	3.1	10.0	6.9
	Colorado	4.7	2.4	12.5	10.1
	Connecticut	4.7	2.8	11.4	8.6
	Delaware	6.6	2.5	19.4	16.9
	District of Columbia	8.3	3.6	19.2	15.6
	Florida	5.6	2.8	13.9	11.1
	Georgia	6.4	3.3	15.5	12.2
	Hawaii	4.6	2.6	9.6	7.0
	Idaho	4.5	2.6	9.8	7.2
	Illinois	5.5	2.9	14.3	11.4
	Indiana	5.6	2.6	16.3	13.7
	Iowa	4.3	2.9	11.2	8.3
	Kansas	4.7	2.8	11.9	9.1
	Kentucky	4.7	3.0	9.8	6.8
	Louisiana	6.1	3.3	12.7	9.4
	Maine	5.6	2.9	11.5	8.6
	Maryland	5.7	2.5	16.2	13.7
	Massachusetts	4.9	3.0	10.5	7.5
	Michigan	4.5	3.1	11.1	8.0
	Minnesota	4.4	2.8	11.9	9.1

State				
Mississippi	6.2	4.0	12.0	8.0
Missouri	4.5	3.1	10.0	6.9
Montana	5.3	3.3	11.1	7.8
Nebraska	4.1	3.0	9.4	6.4
Nevada	5.3	2.8	11.0	8.2
New Hampshire	5.2	2.5	12.7	10.2
New Jersey	5.1	2.7	12.5	9.8
New Mexico	6.3	3.0	13.4	10.4
New York	6.6	3.4	14.5	11.1
North Carolina	5.3	3.0	11.9	8.9
North Dakota	4.8	3.4	9.5	6.1
Ohio	3.9	2.6	8.8	6.2
Oklahoma	5.3	3.5	10.5	7.0
Oregon	4.1	2.7	8.5	5.8
Pennsylvania	5.5	3.3	13.3	10.0
Rhode Island	5.3	2.9	12.3	9.4
South Carolina	6.5	3.1	14.8	11.7
South Dakota	4.5	3.1	9.3	6.2
Tennessee	5.1	3.0	11.0	8.0
Texas	6.0	3.3	12.8	9.5
Utah	3.7	2.1	8.5	6.4
Vermont	6.2	2.8	13.4	10.6
Virginia	4.2	2.5	10.2	7.7
Washington	4.6	2.8	9.8	7.0
West Virginia	4.8	3.4	9.3	5.9
Wisconsin	5.0	3.0	14.8	11.8
Wyoming	5.4	2.5	10.6	8.1